

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Group Art Unit: 1741

Examiner: E. WONG

Serial No.: 09/Not yet assigned
(This is a Divisional Patent Application of
U.S. Serial No. 08/691,241 filed August 2, 1996)

Filed: On even date herewith

For: Porous Structures Having a Pre-metallization Conductive Polymer Coating and
Method of Manufacture

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Prior to the calculation of fees and the examination of the above-identified application, kindly
amend the application as follows:

AMENDMENT

In the Specification:

Kindly amend the specification as follows:

On page 1, before line 3, insert:

Cross-Reference to Related Applications

This application is a Divisional of U.S. Patent Application Serial No. 08/691,241 filed
August 2, 1996, the disclosure of which is being incorporated herein by reference in its entirety.

A marked-up version of page 1 of the specification wherein the Cross-Reference to Related
Applications data has been inserted is attached hereto.

In the Claims:

Please cancel claims 1-13.

Please add new claims 14-31 and follows:

Claim 14. (New) A complex porous structure of reticulated material selected from the group consisting of foam, felt and fabric produced by a process comprising

electroplating said material with metal substantially throughout its entire developed surface, subsequent to

pre-metallization, said pre-metallization comprising depositing a conductive polymer, said depositing comprising:

(1) oxidizing a base structure comprising pores,

(2) rinsing,

(3) depositing, in a wet phase, on surfaces of the base structure, a monomer which in a polymerized form is electrically conductive,

(4) polymerization of the monomer by oxidation-doping into an electrically conductive polymer, and

(5) rinsing, wherein said steps are carried out on the base structure, substantially throughout its entire thickness, without clogging the pores of the base structure.

Claim 15. (New) The structure according to claim 14, wherein the oxidizing comprises treating the base structure with a solution of potassium permanganate.

Claim 16. (New) The structure according to claim 15, wherein the oxidizing comprises immersing the base structure in a solution of potassium permanganate.

Claim 17. (New) The structure according to claim 14, wherein the monomer deposited is selected from the group consisting of pyrrole, furane, thiopene and derivatives thereof.

Claim 18. (New) The structure according to claim 14, wherein the monomer deposited is selected from the group consisting of pyrrole, and polypyrrole.

Claim 19. (New) The structure according to claim 17, wherein the pyrrole is dissolved in an alcohol.

Claim 20. (New) The structure according to claim 18, wherein the wet phase comprises a pyrrole solution for deposition of the monomer onto the developed surface of said complex structure, said pyrrole solution comprising an aqueous solution comprising at least 50% by volume water, and isopropanol solvent for pyrrole.

Claim 21. (New) The structure according claim 18, wherein said depositing comprises precipitation of the monomer by immersing the complex structure in an aqueous solution comprising at least 50% water by volume, and isopropanol as a solvent for pyrrole.

Claim 22. (New) A metallized structure produced by electroplating the complex porous structure produced by claim 14 wherein electroplating is carried out in an electrolysis bath comprising ions which stabilize or oxidize an anodic structure.

Claim 23. (New) The metallized structure according to claim 22, wherein the electroplating is carried out under pulsed current with current reversal, at least during an initial phase of electrolysis, until formation of a metallic deposit whose conductivity is at least equal to that of the electrically conductive polymer.

Claim 24. (New) The metallized structure according to claim 22, wherein the electroplating is carried out during an initial electrolysis phase, until constitution of a metallic deposit of conductivity at least equal to that of the electrically conductive polymer, at a low current density.

Claim 25. (New) The metallized structure according to claim 22, wherein said metal used for electroplating is selected from the group consisting of copper, nickel, iron, chromium, zinc, aluminum, tin, lead, gold, platinum, an alloy mixture of at least two of said metals, and superposition of at least two of said metals.

Claim 26. (New) The complex porous structure of claim 14, further comprising draining and drying following the rinsing subsequent to the oxidizing.

Claim 27. (New) The complex porous structure of claim 26, comprising draining following the rinsing subsequent to the polymerization of oxidation-doping.

Claim 28. (New) The complex porous structure of claim 27, comprising drying following the draining following the rinsing subsequent to the polymerization of oxidation-doping.

Claim 29. (New) The complex porous structure of claim 28, comprising draining following the rinsing subsequent to the oxidizing pre-treatment.

Claim 30. (New) The complex porous structure of claim 29, comprising repeating said steps following the rinsing subsequent to the oxidizing pre-treatment a preselected number of times.

Claim 31. (New) The complex porous structure of claim 19, wherein said alcohol comprises isopropanol.

REMARKS

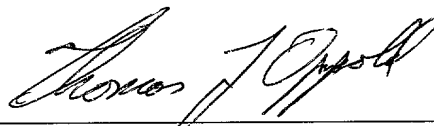
Claims 14-31 are pending in the above-identified application.

Favorable action is most earnestly solicited.

If the Examiner has any questions, or wishes to discuss this matter, please contact the undersigned at the telecommunication numbers listed below.

Respectfully submitted,
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Date: 7/12/01



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POROUS STRUCTURES HAVING A PRE-METALLIZATION CONDUCTIVE POLYMER COATING AND METHOD OF MANUFACTURE

The invention concerns, in general, the manufacture of complex porous metallic or metallized structures.

5 This invention relates more particularly to the manufacture of complex porous metallic or metallized structures for application as electrodes for the electrolysis of liquid effluents, as electrode supports for electrochemical generators, as catalyst supports, filtration media, phonic insulation, electromagnetic and nuclear protection structures, or for other
10 applications.

The metallic or metallized structures according to the invention are of the foam, felt or fabric type having a high level of open porosity, and having the aspect of a dense network of fibers or mesh with a three dimensional skeletal structure defining a plurality of open spaces
15 intercommunicating with one another and with the exterior of the structures.

Foams are reticulated cellular structures of high porosity (greater than 80%, and possibly reaching 98%) and having an open porosity by inhibiting cell wall formation, wherein the totality of the
20 network's openings, or at least a high proportion thereof, are in communication with one another.

Felts are randomly interlaced matted fibers defining therebetween inter-fiber spaces of variable shapes and dimensions, communicating with one another.

25 Fabrics are structures constituted by an assembly of textile threads or fibers that are interlaced, either woven or netted. They may be in the form of thick and complex structures, in particular when they are made of two external woven faces connected by knitted threads that hold them simultaneously spaced apart and interconnected, as for example can
30 be produced using Raschel type knitting machines.

These various complex porous structures, that according to the invention will be metallized throughout their entire thickness, over all their developed surface, without clogging of their porosity, may be provided starting from various base materials.

Cross-Reference to Related Application.
This application is a Division of U.S. Patent Application Serial No. 08/696,241
filed August 2, 1994. The disclosure of which is being incorporated herein
by reference in its entirety.